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GENERATOR

25X1

July 15, 1958

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Dear Sir:

This letter report describes the activity under Task Order No. C during June, 1958.

During this period, four runs were made in the small experimental generator. These included two 1/10-scale runs, which completed the 1/10-scale temperature-dependence tests, and two 1/5-scale runs, to explore the scale factor.

1/10-Scale Runs

Data for the two 1/10-scale runs (Nos. 14 and 15), are presented in Table 1.

These two runs were made with the generator unit partially immersed in a tank containing about 1,100 gallons of water, in order to study heat losses under simulated-field generation conditions. As previously noted, the water surrounding the generator unit exerts a noticeable cooling effect.

The catalyst concentration was selected in these runs to give reaction times well under 1 hour. The data at 47 and 65 degrees F from Runs 11, 13, 14, and 15 were then plotted to show the variation of catalyst weight with temperature for total generation times of 34 to 42 minutes in 1/10-scale tests.

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TABLE 1. EXPERIMENTAL RESULTS FOR 1/10-SCALE
RUNS (370-cu-ft charges)

Run No.	Volume H ₂ , cu ft	Temperature, F		CoCl ₂ ·6H ₂ O, lb	Per Cent Reaction	Total Generation Time, min
		Initial	Rise			
14	*	66	35	1.98	(~100)	42
15	360	65	29	2.17	98	35

*Reaction followed by temperature measurement only.

TABLE 2. EXPERIMENTAL RESULTS FOR 1/5-SCALE
RUNS (740-cu-ft charges)

Run No.	Volume H ₂ , cu ft	Temperature, F		CoCl ₂ ·6H ₂ O, lb	Total Generation Time, min
		Initial	Rise		
16	*	66	46	4.4	23
17	*	55	57	11.7	Approx. 8

*Reaction followed by temperature measurement only.

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1/5-Scale Runs

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One 1/5-scale run at 66 F served to check the scaling effect on the new temperature versus catalyst plot. Run 16, described in Table 2, closely approximated the conditions of Run 15 in Table 1, except that Run 16 used double the amount of reagents. Because in the larger scale tests the generator is less efficiently cooled by the surrounding pool, it was expected that the 1/5-scale run would be faster than the 1/10-scale runs.

The results of Run 16 bore out the expectation. The total generation time was reduced to 23 minutes, and the temperature rise was higher (in the shorter time). These results will be used as a basis for scaling up the catalyst requirements for the full-scale-generator tests.

In Run 17 (Table 2), almost twice the weight of catalyst was added as would have been needed for approximately a 30-minute generation time. The generation was so rapid in this run that the time, reported as 8 minutes, was only approximate. Although the use of a high catalyst concentration reflected an experimental error, Run 17 showed that controlled reactions can be accomplished in very short times, if the equipment is designed to handle high rates of gas evolution, and if the extra amount of catalyst needed is within the total-weight limitation.

During July, preparations for full-scale gas generation will be made. These tests will take place at a private lake. It

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is planned that a 1/10-scale experiment will be run at this site before the two full-scale experiments are performed. This 1/10-scale test is expected to reveal any radical differences between the lake water and the water used in all of the other small-generator tests.

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The total appropriation on this Task Order was \$44,143. As of July 1, 1958, the unexpended balance was approximately \$4,700.

Sincerely,

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In Duplicate

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